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PICTURE OF THE MONTH

Frontal Wave Development and Tropical Storm Abby

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The development of a frontal wave is characterized in satellite pictures by a distinct widening of the frontal cloud band. As a wave develops, the clouds accompanying the front become thicker and more extensive, and begin to bulge back toward the cold air.

In this ESSA-6, APT mosaic (fig. 1), a long frontal cloud band (A-B) lies off the east coast of the United States. The marked broadening of the frontal band at (D)

suggests wave development on the front in this area. A long thin shadow, cast by this increased area of high level clouds, can be seen on the lower clouds immediately to the west of (D). A sharp change from cyclonic to anticyclonic curvature between (C) and (D) along the trailing edge of the frontal cloud band clearly marks the area of wave development. The accompanying analysis (fig. 2) shows a closed low-pressure center at the surface south-

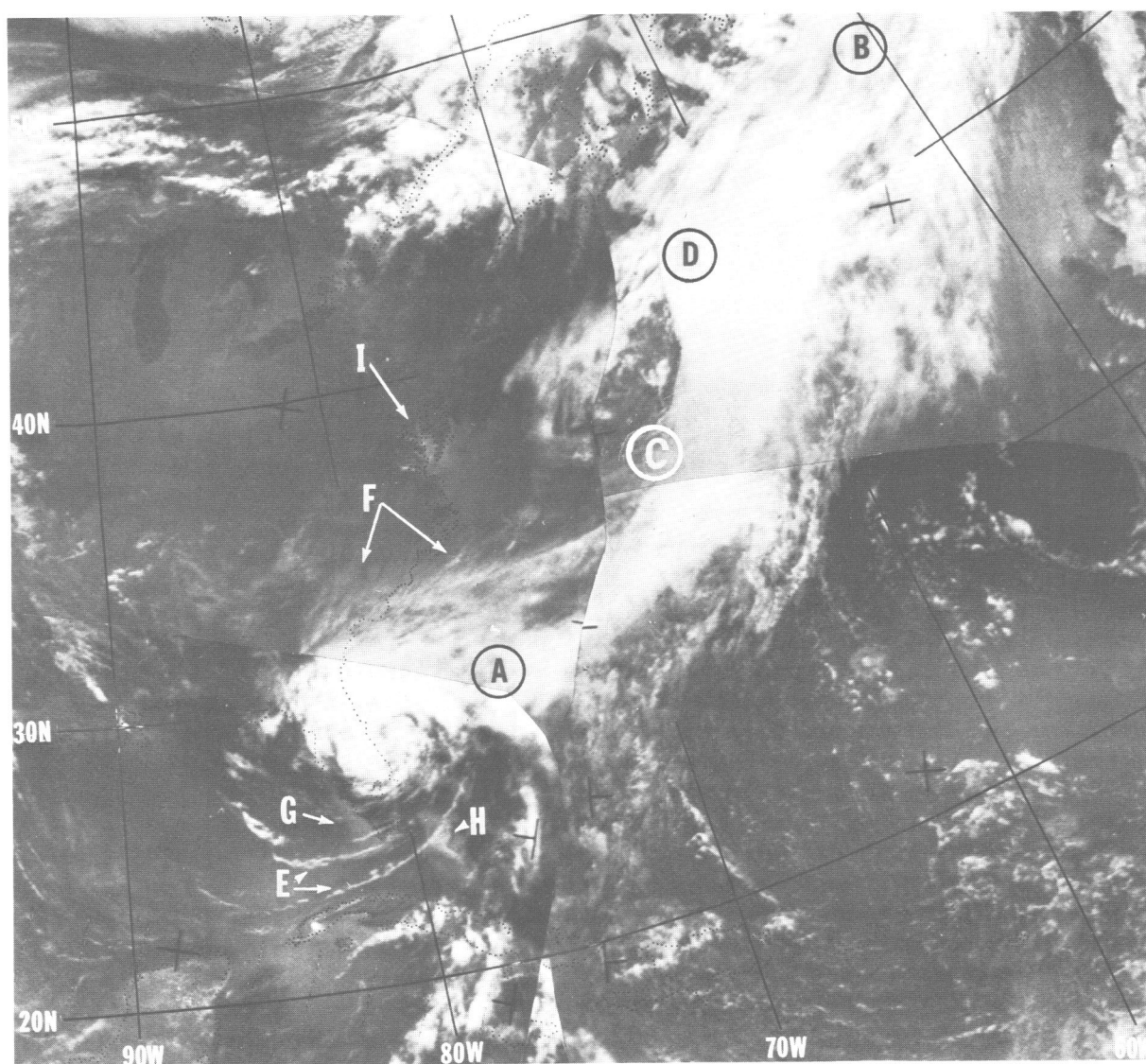


FIGURE 1.—ESSA-6 APT Pass 2605-2606, 1351-1546 GMT, June 5, 1968.

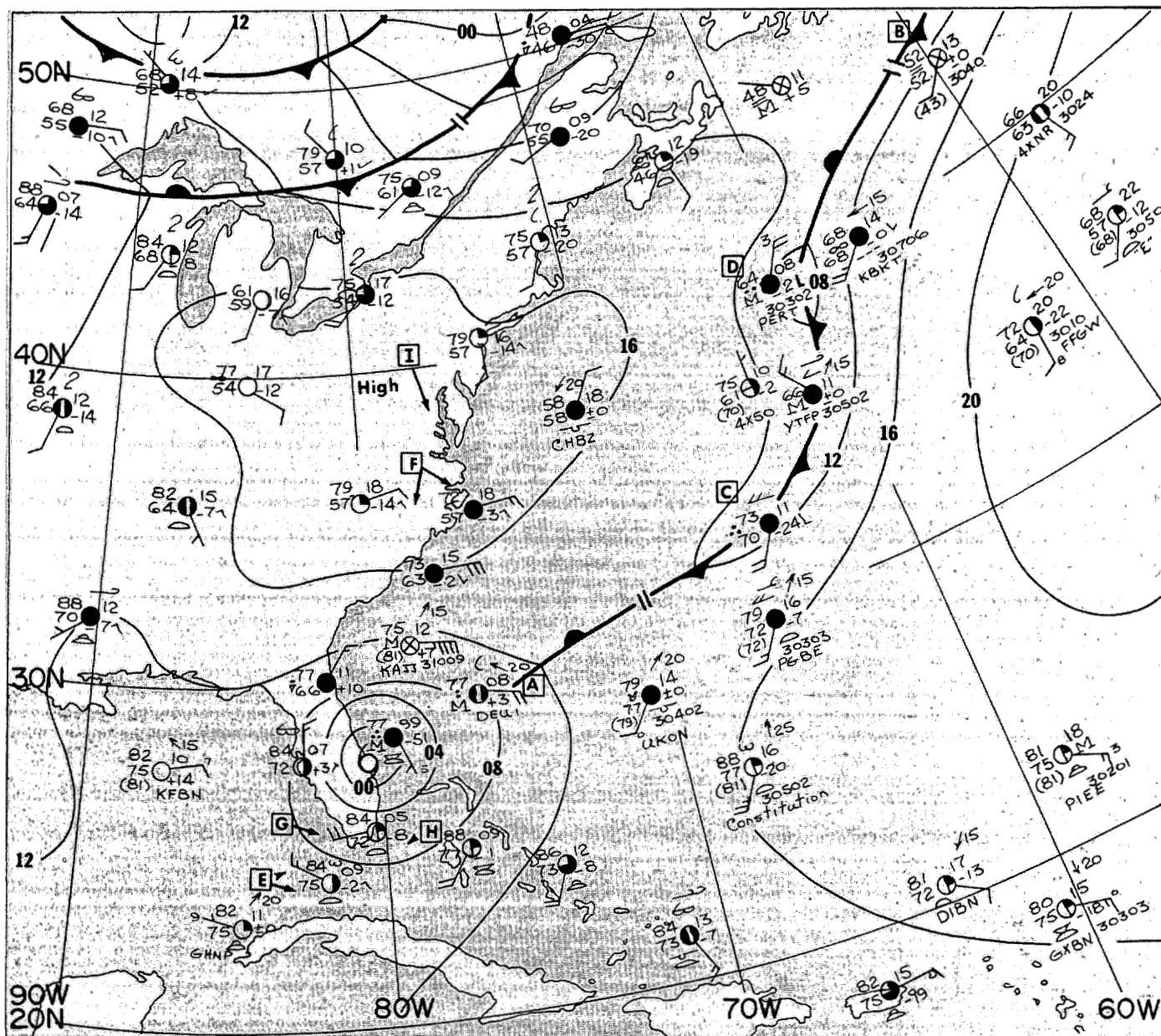


FIGURE 2.—Surface analysis 1800 GMT, June 5, 1968.

east of (D). At this stage of development, no closed circulation pattern appears in the upper levels; therefore the clouds do not spiral into a center as is the case of a mature storm. By the following day, the wave had deepened and moved northward up the front, and a distinct vortical cloud pattern could be seen in the satellite pictures.

Tropical storm Abby can be seen at the southern end of this frontal band. Abby developed in the Gulf of Mexico and moved northeastward across Florida. At the time of this picture, the storm was located along the east coast of Florida. Numerous long, thin, cumuliform cloud lines (E) can be seen curving cyclonically from north of Cuba into the central overcast of the storm. Along the northern periphery, the gray fibrous clouds at (F) mark the area of cirrus in the upper level outflow from the tropical storm.

The strong winds associated with this storm disturbed the shallow water area near Florida, and as a result, sand remained suspended in large areas of the shallow water. These sand-laden waters appear as two bright areas along the western coast of Florida (G) and the Bahamas (H) in the satellite picture.

This APT picture also provides an excellent clear sky view of the eastern United States. Slight variations in the color of the land represent variations in the forms of vegetation in this area. Sun glint on the Chesapeake Bay and adjoining tributaries clearly outline the coastal land mass in this area.

The picture discussed here illustrates some of the applications of satellite data to both meteorology and oceanography.